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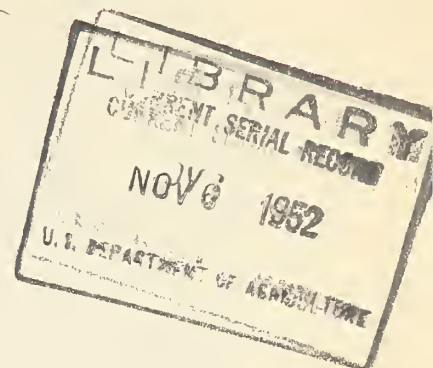
UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH ADMINISTRATION
BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY

✕ LIST OF PUBLICATIONS AND PATENTS ✕
of the
Northern Regional Research Laboratory
Peoria, Illinois

January - June 1952

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PUBLICATIONS



THE CHARACTERISTICS OF PULP FIBERS FROM AGRICULTURAL RESIDUES.

Elbert C. Lathrop.

U. S. Dept. Agr. Bul. AIC-323. 12 pp. (Processed.) January 1952.

The physical and chemical properties of a wide variety of agricultural residues and fibers suitable for papermaking are discussed. Pulping methods suitable for preparing paper and board pulps are mentioned and the suitability for use of the various pulps produced in making a wide range of paper and board products are described. The paper emphasizes particularly that by the use of these agricultural raw materials a wide range of improved paper and board products may be manufactured and that the use of these raw materials is one of the most direct ways of remedying the present and coming shortage of raw materials for paper manufacture.

PENICILLIN REPRINT LIST.

U. S. Dept. Agr. Bul. AIC-329. 2 pp. (Processed.) January 1952.

This is a list of reprints of the Northern Laboratory's papers on penicillin.

PULPS FROM STRAW AND SUGARCANE BAGASSE FOR MANUFACTURE OF NEWSPRINT.

E. C. Lathrop.

U. S. Dept. Agr. Bul. AIC-327. 4 pp. (Processed.) January 1952.

Present-day newsprint is composed of a blend of 80 to 88 percent mechanical wood pulp with the remainder chemical pulp ordinarily produced from spruce or hemlock. The printing and other qualities of newsprint are largely dependent on the mechanical wood pulp used. Paper-machine trials have indicated that either bleached straw or sugarcane bagasse pulp can replace the chemical wood pulp and produce a paper having essentially the properties of standard newsprint. What is called standard newsprint cannot be made from 100-percent chemical pulp produced from any material, whether softwoods, hardwoods, straw, bagasse, or other wastes. It is possible, however, to manufacture from 100-percent chemical pulps papers which can be printed and run on high-speed presses. It is stated that whether a product differing from standard newsprint is acceptable to the newspaper trade will be decided eventually by newspaper publishers.

STALK FORMATION IN *Dictyostelium*.

Kenneth B. Raper and Dorothy I. Fennell.

Bul. of the Torrey Botanical Club 79(1): 25-51. January 1952.

In the primitive slime molds belonging to the genus *Dictyostelium*, stalk formation is accomplished by the extracellular deposition of cellulose to form a tube or mold, within which entrapped myxamoebae differentiate into a pith-like tissue. Since the cellulosic stalk wall is formed extracellularly, rather than intracellularly as in all higher plant forms, these organisms should provide exceptional favorable material for investigating the phenomenon of cellulose formation and deposition. Tests which indicate that the building material is cellulose include staining reactions, solubilities, birefringence with polarized light, X-ray diffraction pattern, presence of glucose upon acid hydrolysis, and attack by cellulolytic bacteria.

TWO NOTEWORTHY FUNGI FROM LIBERIAN SOIL.

Kenneth B. Raper and Dorothy I. Fennell.

Amer. Jour. Bot. 39(1): 79-86. January 1952.

Two particularly striking fungi were observed in streak plates of soil samples from Liberia. Upon isolation these were found to represent (1) *Heterocephalum aurantiacum* Thaxter and (2) a member of the Kickxellaceae. This is apparently the first reisolation of *H. aurantiacum* since Thaxter described the genus and species in 1903. The second isolate represents a new genus and species for which the name *Linderina pennisporea* is proposed. Growth characteristics of this form bear a striking resemblance to species of *Coemansia* and other recognized members of the Kickxellaceae. In contrast to related genera, the sporocladia are sessile, nonseptate, and dome-shaped, and are generally borne sympodially on terminal branches of long, erect conidiophores. The conidia, which are obclavate and winged at the distal end, are borne singly on sterigmata which cover the greater portion of the sporocladium.

VAPOR PRESSURES AND DISTILLATION OF METHYL ESTERS OF SOME FATTY ACIDS.

Troy A. Scott, Jr., Duncan Macmillan, and Eugene H. Melvin.

Indus. and Engin. Chem. 44(1): 172-175. January 1952.

Boiling points of the methyl esters of the even-numbered C_8 to C_{18} fat acids were determined at pressures from 0.1 to 6 mm. Hg. The purity of the saturated esters, together with the freezing points of the pure compounds, were calculated from freezing point curves. Constants for the Antoine equation were calculated for each ester. All calculated boiling points were within $\pm 0.2^\circ$ C. of experimental values. A calculation was made of the number of theoretical plates required to separate consecutive pairs of saturated esters and various pairs of the C_{18} esters.

TEST RESULTS WITH DUAL-FUEL CARBURETION AT HIGH COMPRESSION.

J. C. Porter, A. P. McCloud, and Richard Wiebe.

Automotive Indus. 196(2): 46-50, 86. January 15, 1952.

Also published in Industries Agricoles et Alimentaires 69(3): 202-208, March 1952, under title "La Double Carburation Par Les Melanges D'Alcool et D'Eau Utilises Comme Anti-Detonant D'Appoint Ou Par L'Emploi D'Essences Alcoolisees."

Instead of requiring the use of all 100-octane gasoline in a more efficient high-compression engine, the dual-fuel carburetor allows the larger percentage of fuel consumed to be commercial (and lower cost) premium-grade gasoline. The use of alcohol or an alcohol-gasoline blend makes available an additional source of high-octane fuel.

STARCH GRANULE SWELLING IN WATER VAPOR SORPTION.

N. N. Hellman, T. F. Boesch, and E. H. Melvin.

Jour. Amer. Chem. Soc. 74(2): 348-350. January 20, 1952.

Microscopic measurements of the swelling of individual starch granules occurring with the sorption of water vapor at various relative pressures are reported for corn, potato, tapioca, and waxy cornstarch. The linear granule swelling in a water-saturated atmosphere over the vacuum-dry dimension is as follows: Corn, 9.1%; potato, 12.7%; tapioca, 28.4%; and waxy corn, 22.7%. For all except tapioca starch, there is practically no hysteresis in the function of swelling vs. relative humidity of the atmosphere with which the starch is equilibrated. For all starches, the function of swelling vs. moisture content shows an absorption-desorption loop with the desorption leg giving smaller granule dimensions for equal water content.

A DECADE OF ANTIBIOTICS IN AMERICA.

Kenneth B. Raper.

Mycologia 44(1): 1-59. January - February 1952.

The far-reaching developments in the field of antibiotics since 1941 are reviewed. The history and growth of the penicillin fermentation is traced from its rebirth at Oxford University in 1940 to July 1951, and its profound influence upon subsequent discoveries and developments is discussed. The discovery and development of four additional major antibiotic drugs, namely streptomycin, chloramphenicol (chloromycetin), aureomycin, and terramycin are considered in some detail, whereas antibiotics of lesser importance receive limited attention. The importance of vitamin B₁₂ and antibiotics in feed supplementation is discussed. Currently the capitalization of the antibiotics industry in the U. S. is estimated to be about \$200,000,000, whereas the wholesale value of its manufactured products exceeds \$250,000,000. A discussion of the influence of antibiotics on national health is also included.

HOMOTHALLISM VS. HETEROHALLISM IN THE *PENICILLIUM LUTEUM* SERIES.

Kenneth B. Raper and Dorothy I. Fennell.

Mycologia XLIV(1): 101-111. January - February 1952.

For a quarter of a century the question of heterothallism in *Penicillium luteum* Zukal has been discussed, and the matter cannot yet be settled with certainty. Derx, in 1925, presented convincing evidence of heterothallism in a strain which apparently represented Zukal's concept of *P. luteum*. More recently, Emmons (1935) has reported a number of ascosporic *Penicillia* to be uniformly hemothallic, including a strain which would seem to duplicate Zukal's species. Extending Emmons' study, and examining additional strains of *P. luteum* together with other members of the *P. luteum* series unavailable to him, the authors have failed to secure any evidence of heterothallism in any member of this series. Much uncertainty regarding the true identity of *P. luteum* Zukal has added further to the confusion which characterizes the existing literature.

CHEMICAL COMPOSITION OF THE MATURE CORN KERNEL.

John A. Cannon, M. M. MacMasters, M. J. Wolf, and C. E. Rist.

Transactions (American Association of Cereal Chemists) 10(1): 74-97. February 1952.

Composition of the corn kernel (not including sweet and popcorn) as reported in the literature from 1880 through August 1951 is summarized in text and tables. Topics covered are: Factors affecting chemical composition; proximate composition; carbohydrates and related compounds; phytic acid, phytin and total phosphorus; nitrogen, proteins and amino acids; oil and related substances; ash; vitamins and pigments; enzymes; hormones; and volatile material. The survey is comprehensive and no attempt is made to evaluate the data on the basis of the analytical methods used. Literature references included number 205.

ENZYMATIC SYNTHESIS OF DEXTRAN.

H. J. Koepsell and H. M. Tsuchiya.

Jour. Bact. 63(2): 293-295. February 1952.

Studies on certain factors affecting the yield of dextransucrase, the dextran-synthesizing enzyme, in corn steep liquor medium revealed that cultures with 20-percent sucrose and pH controlled at 6.7 throughout the fermentation developed high enzymatic activity. The pH optima for both stability and activity of the enzyme was about 5.0 to 5.2. Although dextransucrase was most active at 32° to 34° C., it underwent fairly rapid destruction at those temperatures, indicating that it should be used at temperatures not to exceed 30° C.

THE FLAVOR PROBLEM OF SOYBEAN OIL. X. EFFECTS OF PROCESSING ON METALLIC CONTENT OF SOYBEAN OIL.

C. D. Evans, P. M. Cooney, H. A. Moser, J. E. Hawley, and E. H. Melvin.

Jour. Amer. Oil Chem. Soc. 29(2): 61-65. February 1952.

Soybean oil samples from each processing step in commercial extraction, refining, and deodorization were investigated to determine the amount and the effects of metallic contamination contributed by each operation. The samples were also evaluated for their stability and edibility. Considerable data are presented on the deodorization process which proved to be a serious source of metallic contamination. The iron and copper contents of nonmetallic processed crude oil are also reported.

INFORMATION ON THE FLAVOR PROBLEM OF SOYBEAN OIL.

J. C. Cowan.

The Bakers Digest 26(1): 43. February 1952.

A short popular review of the research the Northern Regional Research Laboratory has conducted on the flavor problem of soybean oil.

MONOGLYCERIDES FROM SOYBEAN OIL BY HYDROLYSIS AND ESTERIFICATION.

R. E. Beal and N. H. Ludwig.

U. S. Dept. Agr. Bul. AIC-330. 5 pp. (Processed.) February 1952.

Details of a method of preparing monoglycerides by hydrolyzing soybean oil and esterifying one-third of the fatty acid layer with the glycerine layer have been investigated. A product prepared by this method was tested in a baking laboratory

and found to compare very favorably with a commercial monoglyceride product in an experimental cake recipe. The process probably could be carried out in a single reaction vessel of suitable design. Since the method does not require purified glycerine, it should be economically attractive to manufacturers of glycerinated shortenings.

THE PRODUCTION OF ORGANIC ACIDS BY FERMENTATION. THE TECHNICAL LITERATURE AND PATENTS OF THE U. S. DEPARTMENT OF AGRICULTURE.

Compiled by Robert G. Dworschack.

U. S. Dept. Agr. Bul. AIC-322. 9 pp. (Processed.) February 1952.

This bibliography is a compilation of technical publications and patents by workers in the U. S. Department of Agriculture on the fermentative production of organic acids. The references supplement a chapter entitled, "Fermentation Acids in Industry," written by Frank H. Stodola and Richard W. Jackson for the 1950-51 Yearbook of Agriculture.

SODIUM GLUCONATE PRODUCTION FERMENTATION WITH *ASPERGILLUS NIGER*.

R. H. Blom, V. F. Pfeifer, A. J. Moyer, D. H. Traufler, H. F. Conway, C. K. Crocker, R. E. Farison, and D. V. Hannibal.

Indus. and Engin. Chem. 44(2): 435-440. February 1952.

Experiments were conducted on a pilot-plant scale to supply engineering data on the production of sodium gluconate by submerged culture of *Aspergillus niger*. The following factors affecting the fermentation were investigated: antifoam agents, sterilization methods, type and quantity of inoculum, agitation, aeration, pressure, and sugar concentration. Sodium gluconate was recovered from the fermented liquors by crystallization and drum drying. Glucose solutions with concentrations up to 35 percent were fermented successfully in less than 40 hours. Operating and investment costs for the process were calculated. Estimates indicate that crude sodium gluconate may be produced commercially by this process at a total plant production cost of 10.5 cents per pound.

ABSTRACTS OF PATENTS OF THE NORTHERN REGIONAL RESEARCH LABORATORY, JANUARY - DECEMBER 1951.

U. S. Dept. Agr. Bul. AIC-331. 4 pp. (Processed.) March 1952.

A list of abstracted Northern Regional Research Laboratory Patents.

THE B-COMPLEX VITAMIN COMPOSITION OF CORNCOBS.

H. H. Hall, J. J. Curtis, and M. C. Shekleton.

Cereal Chem. 29(2): 156-160. March 1952.

Cobs from 25 varieties of corn, grown in 6 states during 4 crop years, were assayed for the vitamins riboflavin, biotin, niacin, pantothenic acid, and pyridoxine. A considerable range in the amount of each vitamin was noted among the varieties of cobs tested: riboflavin, 0.8-2.6 micrograms per gram; biotin, 0.2-0.6 micrograms per gram; niacin, 4.3-16.0 micrograms per gram; pantothenic acid, 3.4-7.0 micrograms per gram; and pyridoxine, 1.0-3.4 micrograms per gram. There was no relationship between the content of different vitamins in a single variety of cobs. The riboflavin content of cobs slightly exceeds that of corn, but is approximately equal to that of wheat, sorghum, and barley. The pantothenic acid content of cobs is approximately equal to that of corn and barley,

but is less than that of wheat or sorghum. Cobs were found to contain less biotin, niacin, pantothenic acid, and pyridoxine than corn, wheat, sorghum, or barley grain.

PREPARING SERIAL SECTIONS OF MATURE CORN AND WHEAT KERNELS.

R. A. Larkin, M. M. MacMasters, I. M. Cull, M. J. Wolf, and C. E. Rist.
Stain Technol. 27(2): 107-112. March 1952.

Methods are described for preparing serial sections of paraffin embedded mature corn and wheat kernels. Corn kernels are steeped 5 days in 50 percent glycerol after killing and fixing; this step is omitted in preparing wheat kernels. Embedded kernels of both corn and wheat are softened by successive exposure to 20 percent glacial acetic acid in 60 percent ethanol, air at 100 percent relative humidity at room temperature, and air at 100 percent relative humidity at 8° C. Kernels prepared by these methods give good serial sections when cut as thin as 14 microns.

SOLUBILITY OF GASEOUS PARAFFINS IN METHANOL AND ISOPROPYL ALCOHOL.

Carl B. Kretschmer and Richard Wiebe.
Jour. Amer. Chem. Soc. 74(5): 1276-1277. March 5, 1952.

The solubilities of propane, n-butane, and isobutane in methanol and isopropanol have been measured at pressures up to 1 atmosphere and at temperatures between 0 and 50° C. Results are reported as mole fraction of hydrocarbon at a given total pressure, and are also presented in the form of an empirical equation. Measurements of the vapor pressure of isopropanol are included. The partial molal excess free energy, enthalpy, and entropy of the hydrocarbons at infinite dilution have been calculated from the results and are discussed in terms of extended association of the alcohols.

N-GLYCOSYL DERIVATIVES OF SECONDARY AMINES.

John E. Hodge and Carl E. Rist.
Jour. Amer. Chem. Soc. 74(6): 1494-1497. March 20, 1952.

New data on the optical rotations of glycosyl derivatives of piperidine, diethanolamine, and dibenzylamine are presented. The D-glucosyl derivatives of piperidine and diethanolamine do not show mutarotation in dry pyridine, whereas the D-galactosyl and D-mannosyl derivatives of piperidine do. Acid catalysts and alcoholic reaction media were found to be unnecessary in the preparation of N-glycosyl derivatives of strongly basic amines. Evidence is given to show that the compound heretofore known as N-D-glucosyldibenzylamine is actually a 1-desoxy-1-amino-fructose (isoglucosamine) derivative.

N-(3,4,6-TRIACETYL-D-GLUCOSYL)-PIPERIDINE AND ITS USE IN PREPARING 2-SUBSTITUTED GLUCOSE DERIVATIVES.

John E. Hodge and Carl E. Rist.
Jour. Amer. Chem. Soc. 74(6): 1498-1500. March 20, 1952.

Crystalline N-(3,4,6-triacetyl-D-glucosyl) piperidine has been isolated from the reaction of piperidine with pentaacetyl-D-glucopyranose, and the structure of this compound has been established. The substance is shown to provide a readily accessible starting product for the preparation of 2-substituted derivatives of D-glucose.

LIST OF PUBLICATIONS - VEGETABLE OILS AND RELATED SUBJECTS OF THE NORTHERN REGIONAL RESEARCH LABORATORY 1951.

U.S. Dept. Agr. Bul. AIC-184, Supplement 4. 2 pp. (Processed.) March 1952.

A list of Northern Laboratory papers and articles published during 1951 on vegetable oils and related subjects.

LIST OF PUBLICATIONS - PROTEINS AND RELATED SUBJECTS OF THE NORTHERN REGIONAL RESEARCH LABORATORY 1951.

U. S. Dept. Agr. Bul. AIC-228, Supplement 4. 2 pp. (Processed.) March 1952.

A list of Northern Laboratory papers and articles published during 1951 on proteins and related subjects.

OCCURRENCE OF YEAST MATING TYPES IN NATURE.

Lynferd J. Wickerham and Kermit A. Burton.

Jour. Bact. 63(4): 449-451. April 1952.

Yeasts were isolated from nature for the first time as haploid mating types. When cultures representing the opposite sexes were mixed, ascospores were produced. It was further found that some yeasts now classified in nonascosporogenous genera were actually mating types. When appropriate strains were mixed, they produced ascospores, and were in all characteristics identical with certain species now classified in sporogenous genera.

SELECTED METHODS FOR DETERMINING REDUCING SUGARS.

John E. Hodge and Howard A. Davis.

U. S. Dept. Agr. Bul. AIC-333. 66 pp. (Processed.) April 1952.

A laboratory manual of detailed procedures, employed in the Starch and Dextrose Division of the Northern Regional Research Laboratory, for the determination of reducing sugars. Included are selected copper, ferricyanide, and iodometric methods, tables for sugar values, and directions for the preparation of reagent solutions.

CYANOETHYLATION OF α -AMINO ACIDS. III. HYDROLYSIS OF CYANOETHYL DERIVATIVES.

L. L. McKinney, E. A. Setzkorn, and E. H. Uhing.

Jour. Amer. Chem. Soc. 74(8): 1942-1943. April 20, 1952.

N-Cyanoethyl and N-bis-cyanoethyl derivatives of alpha-amino acids were hydrolyzed with acids and bases to give N- β -carboxyethyl derivatives. Alkali hydrolysis proved to be the most practicable. N-bis-cyanoethyl derivatives gave mono-carboxyethyl derivatives on hydrolysis with one cyanoethyl group being split off.

ALCOHOL AS AN ANTIKNOCK AGENT IN AUTOMOTIVE ENGINES.

James C. Porter and Richard Wiebe.

Indus. and Engin. Chem. 44(5): 1098-1104. May 1952.

The octane number increase obtained with ethanol injection depends on the amount of alcohol (up to 25 percent), the composition and the octane level of the fuel, and the composition of the alcohol-water mixture. The upper octane limits for alcohol fuels appear to be approximately their Research and Motor Method ratings. By a slight retarding of the spark advance it is possible to obtain

knock-free operation in a 10:1 General Motor Company high compression test engine mounted in a 98 Oldsmobile, using a good grade premium gasoline and a 50:50 alcohol-water mixture. Average results of combined city and country driving in this case indicate a mixture consumption of about 1 percent.

DRY GRINDING OF AGRICULTURAL RESIDUES -- A NEW INDUSTRIAL ENTERPRISE.

T. F. Clark and E. C. Lathrop.

U. S. Dept. Agr. Bul. AIC-336. 36 pp. (Processed.) May 1952.

Dry grinding of agricultural residues as a soundly established business is considered from both a technological and economic point of view. The availability of agricultural residues, their chemical and physical characteristics, their accumulation, end uses, and merchandising methods are discussed. The problems of processing, such as in grinding and classifying, and the fire and explosion hazards are considered in the light of data accumulated from actual tests. Results with 10 types of mills or grinders are reported. Nineteen tables of data, 18 illustrations, and 42 references support the text.

NEW OILSEEDS FOR INDUSTRY.

R. T. Milner.

Chemurg. Digest 11(5): 10-13. May 1952.

A general review is given of the most recent information available on the newer and potentially important oilseed crops. In defining new oilseeds the discussion is limited to castor, safflower, sesame, and sunflower. Steps by which a successful oilseed crop is developed are outlined and the status of the four oilseeds is indicated in this progression toward their chemurgic significance.

PRODUCTION OF ITACONIC ACID BY *ASPERGILLUS TERREUS* IN 20-LITER FERMENTORS.

George E. N. Nelson, Donald H. Trautler, Sinah E. Kelley, and Lewis B. Lockwood.

Indus. and Engin. Chem. 44(5): 1166-1168. May 1952.

Itaconic acid has been produced in 45-54 percent weight yield from glucose, using 20-liter stainless steel fermentors. The pH was maintained at 1.8-2.0 by infrequent additions of H_2SO_4 , KOH, or NH_4OH . Continuity of airflow was found to be very critical; interruptions of only a few minutes stopped the fermentation and could not be started again. Best yields were obtained with a glucose concentration of about 6 percent and a corn steep liquor concentration of 0.15 percent.

PROTEIN DENATURATION IN SOYBEAN MEAL DURING PROCESSING.

Paul A. Belter and Allan K. Smith.

Jour. Amer. Oil Chem. Soc. 29(5): 170-174. May 1952.

Protein denaturation of soybean meals processed by five commercial firms was found to occur mainly in the final meal treating steps. These conclusions are based on determinations of the change in solubility of the nitrogenous compounds resulting from the eight major processing steps.

SURFACTANTS AND DETERGENTS FROM SULFATED N-ALKYL-D-GLUCONAMIDES.

C. L. Mehlretter, M. S. Furry, R. L. Mellies, and J. C. Rankin.

Jour. Amer. Oil Chem. Soc. 29(5): 202-207. May 1952.

A number of N-alkyl-D-gluconamides and a rosin substituted D-gluconamide were prepared in good yield by reacting long chain fatty amines and rosin amine with D-glucono-delta-lactone. Reaction of these compounds with chlorosulfonic acid yielded sulfates of various degrees of substitution whose sodium salts exhibited marked surface active properties. Soil-removal tests with cotton fabric showed several of these products to be effective detergents in hard water.

AN OBSERVATION ON THE INFRARED ABSORPTION SPECTRUM OF DEXTRAN.

Stanley C. Burket and Eugene H. Melvin.

Science 115(2993): 516-517. May 9, 1952.

The infrared absorption spectra of dried films of a wide variety of undegraded dextrans produced by different organisms under different conditions were examined. Throughout most of the spectral region, 3μ to 15μ , these spectra resemble each other quite closely but some quite noticeable variations were observed between 12μ and 14μ . These differences are explained by assuming the existence of two basic types of dextran which occur in varying proportions.

MICROBIAL SYNTHESIS OF RIBOFLAVIN.

Thomas G. Pridham.

Econ. Bot. 6(2): 185-205. April - June 1952.

A critical review of the literature concerning the microbial synthesis of riboflavin has been made. Particular emphasis has been placed upon the use of microorganisms for the industrial production of this vitamin. Most microorganisms produce riboflavin in excess of their own requirements, however the number of species which produce a sufficient excess to be of commercial interest is limited. Among the bacteria, species of *Clostridium* are outstanding, whereas species of *Aerobacter* and *Azotobacter* produce smaller but significant amounts. Of the yeasts, species of *Candida* show the greatest flavinogenic capacities, whereas other yeasts such as *Saccharomyces* and *Torulopsis* produce sufficient riboflavin to enhance the nutritive value of cells produced for food and feed purposes. Of the higher fungi, the two yeast-like forms *Ashbya gossypii* and *Eremothecium ashbyii* are particularly outstanding and are capable of riboflavin synthesis far in excess of any other known microorganisms. The realization of maximum riboflavin synthesis is dependent upon careful strain selection, the use of suitable substrata, and the establishment of optimal fermentation conditions.

PREPARATION OF METHYL LINOLEATE HYDROPEROXIDE.

K. T. Zilch, H. J. Dutton, and J. C. Cowan.

Jour. Amer. Oil Chem. Soc. 29(6): 244-246. June 1952.

Safflower methyl esters were oxidized to 0.2 mole oxygen per mole ester and subjected to a 3-plate countercurrent distribution between pentane-hexane and 80 percent ethanol. Methyl linoleate hydroperoxide separated from the 80 percent ethanol layer after dilution with water to 50 percent.

THE UTILIZATION OF NORELAC RESINS IN PROTECTIVE COATINGS.

A. J. Lewis, L. B. Falkenburg, and J. C. Cowan.

Paint, Oil and Chem. Rev. 115(13): 13, 14, 16, 17. June 19, 1952.

This is a report on durability tests with the polyamide resin of polymeric soybean fat acid and ethylene diamine as a wood sealer, corrosion resistant coating, and finish coating on wood and steel.

THE AMERICAN PAPER INDUSTRY NEEDS STRAW AND BAGASSE.

S. I. Aronovsky.

Paper Trade Jour. 134(26): 68, 70, 72, 74, 76, 78, 80, 82. June 27, 1952.

Paper Mill News 75(26): 120-122, 124, 126, 128, 130, 131, 150. June 28, 1952.

The availability of agricultural residues as raw material for the pulp and paper industry is discussed and the suitability of these materials is pointed out. Wheat straw and sugarcane bagasse are the most desirable at present from the overall standpoint of quantity, availability, procurement, and quality of pulp produced. The pulping characteristics of and the pulp properties from these two materials are discussed. Newer pulping methods produce high yields of excellent, strong paper pulps from straw and bagasse. These pulps when blended with wood pulps produce specialty papers with better properties than can be produced from either type of pulp alone. Straw and bagasse must be considered as supplementary rather than as substitute raw materials for the American pulp and paper industry.

THE INDUSTRIAL UTILIZATION OF RICE HULLS.

Elbert C. Lathrop.

1952 Rice Annual, pub. by Rice Jour. Pp. 13-16, 69-79.

The paper critically reviews the research work carried out on the utilization of rice hulls during the past 40 years. The more obvious and more important industrial utilization fields have been rather fully explored. Rice hulls fail to meet industrial requirements in many cases because of their high silica content. The possibility of capitalizing on this outstanding quality of rice hulls by exploring more fully their industrial uses as cleaning agents is stressed. Since in numerous cases the mills are required to pay several dollars per ton for disposing of rice hulls, it is recommended that it would be well to explore better methods of using rice hulls for developing power, particularly since rice hull ash seems to have some rather good industrial possibilities.

POLYSACCHARIDE ARYL CARBAMATES. II. NUCLEAR SUBSTITUTED TRICARBANILATES OF CORN STARCH, CORN AMYLOSE, AND AMYLOPECTIN.

Ivan A. Wolff, Paul R. Watson, and Carl E. Rist.

Jour. Amer. Chem. Soc. 74(12): 3061-3063. June 20, 1952.

Trisubstituted *o*- and *m*-chlorocarbanilates, 2,5-dichlorocarbanilates, *o*-, *m*-, and *p*-methylcarbanilates, and *p*-bromocarbanilates of corn starch, corn amylose, and amylopectin were prepared by reaction of the polysaccharide with the appropriate isocyanate in pyridine. At 80° C. the order of reactivity of the various aryl isocyanates with corn starch granules was *m*-chlorophenyl > phenyl > *m*-tolyl > 2,5-dichlorophenyl > *o*-chlorophenyl > *p*-bromophenyl > *p*-tolyl > *o*-tolyl > α -naphthyl. A chelate structure for the *o*-chloro and *o*-methylcarbanilates has been proposed. In conformity with the postulated intramolecular bonding, these orthosubstituted derivatives have greatly different optical rotations, lower melting ranges, and for the chloro compounds, lower solution viscosity and increased solubility in nonpolar organic solvents as compared with the meta and para isomers.

ROTARY DISPERSION OF AMYLACEOUS POLYSACCHARIDES AND THEIR TRIESTERS.

Ivan A. Wolff, Paul R. Watson, and Carl E. Rist.

Jour. Amer. Chem. Soc. 74(12): 3064-3066. June 20, 1952.

Measurements of rotatory dispersions in the visible region have been made for corn amylose and amylopectin in alkali, for cornstarch, corn amylose, and amylopectin triacetates and tricarbanilates in chloroform and pyridine, respectively, and for dextran tricarbanilate in morpholine. The rotatory dispersions were all simple and normal. One-term Drude equations were calculated for the dispersions. Effects of the phenyl group in determining the optical rotations of the carbanilates have been indicated.

REPUBLICATIONS

SOFT GRITS FOR BLAST CLEANING.

T. F. Clark and E. C. Lathrop.

Electrical Construction and Maintenance 50(11): 80. November 1951.

(Shortened content of "Soft Grits Provide Low Cost Method for Blast Cleaning Metals," Materials and Methods 31(5): 67-69, May 1950.

Condensation in Amer. Mach. 94(12): 127, June 1950.

PATENTS

[These patents are assigned to the Secretary of Agriculture. Copies of patents may be purchased from the U. S. Patent Office, Washington, D. C.]

FIBERBOARD CONSTRUCTION.

Glen E. Babcock, Vernon L. Johnsen and Allan K. Smith.
U. S. Patent 2,580,391. January 1, 1952.

A formulation for a laminating glue of good water resistance and strength characteristics, consists of about 10 to 18 parts of soy flour, 2 to 10 parts of soy protein, 2.5 to 10 parts of a 20-percent solution of an ammonium resin or its alkali metal salts, 2.5 to 10 parts saponified rosin, 10 to 15 parts of an 8-percent sodium hydroxide solution. Sufficient water is added to make a spreadable glue containing about 18 to 26 percent solids. The glue has a high tack and a pot life of 96 hours or longer.

SYNTHETIC RESINS FROM MALEIC ANHYDRIDE-ALKYL OLEATE ADDUCT AND AN ALKYLENE DIAMINE.

John C. Cowan and Howard M. Teeter.
U. S. Patent 2,582,235. January 15, 1952.

An adduct is made by the reaction of equimolecular proportions of a lower alkyl oleate ester and maleic anhydride. The oleate esters may be obtained from the monomeric fraction which results in processes for preparing polymeric fat acids from fatty oils, such as soybean oil, linseed oil, and the like. The adduct is reacted with an alkylene diamine in equimolecular proportions and the mixture heated 4 to 20 hrs. at 120°- 225° C. to produce polyamide resins that are fusible and soluble in organic solvents. They have a molecular weight of 2,000 to 4,000 and are useful in moisture-proof and anticorrosive coating compositions.

STABILIZATION OF SOYBEAN OILS WITH P-TOLUENE SULFONIC ACID.

Arthur W. Schwab, Cyril D. Evans and John C. Cowan.
U. S. Patent 2,583,602. January 29, 1952.

A marked stabilizing effect against oxidative deterioration is obtained by the addition of minor amounts of p-toluene sulfonic acid to soybean oils.

PROCESS FOR THE CONTINUOUS RECYCLING OF AN ALCOHOLIC OIL SOLVENT IN OIL EXTRACTION.

Arthur C. Beckel and John C. Cowan.
U. S. Patent 2,584,108. February 5, 1952.

Oleaginous seed material, such as soybean flakes, is extracted with a hot alcoholic solvent. The solvent is recirculated continuously through the seed material after cooling to separate out extracted oil and treating to remove water. In the state of equilibrium reached when operation is continuous, the proportion of dissolved alcohol-soluble constituents becomes constant. The alcoholic solvent in this continuous system is an efficient oil extractant indefinitely. The alcohol solubles carried out of the system by entrainment in the extracted flakes balance the amount of such solubles that are removed from the fresh feed flakes. Thus, there is a net removal of only oil and water from the flakes that are fed to the system.

REDUCTION OF OXYDIVALERONITRILE.

Kliem Alexander and Lester E. Schniepp.
U. S. Patent 2,584,970. February 12, 1952.

Oxydivaleronitrile is prepared from such source materials as corncobs, oat hulls, and other agricultural residues. The immediate raw material employed is tetrahydrofuran, derivable from furfural by known methods. Oxydivaleronitrile is prepared and subsequently reduced with sodium and alcohol to produce diaminodiamyl ether. This compound is useful in the plastics industry.

ACYLATION OF DEXTRAN IN FORMAMIDE.

Allene R. Jeanes and Carl A. Wilham.
U. S. Patent 2,587,623. March 4, 1952.

Dextran is dissolved in formamide and then acetylated with acetic anhydride in the presence of pyridine.

METHOD FOR DEFATTING STARCH.

Carl E. Rist, Howard A. Davis and Ivan A. Wolff.
U. S. Patent 2,587,650. March 4, 1952.

Starch is defatted by extraction with a hydrophilic fatty acid solvent such as a lower aliphatic alcohol, acetone, dioxane, etc. The extraction is carried out at 105° - 125° C. and at absolute pressures of 2-7 atmospheres. The fatty acid content of starch can be reduced consistently to values below 0.1 percent by this method.

PREPARATION OF KETO ACID COMPOUNDS.

Lyle C. Woods and Howard M. Teeter.
U. S. Patent 2,589,314. March 18, 1952.

Long chain fatty acid esters which contain the chlorohydrin ether grouping are converted into corresponding keto derivatives, the ether group being transformed into a carbonyl group. Conversion is accomplished by heating the ester between 150° and 300° C. at a pressure of 1 to 200 milliliters of mercury for 2 to 4 hours. The starting compound may be prepared by reacting a long-chain fatty acid ester with a molecular equivalent of t-butyl hypochlorite in the presence of an alcohol. The product, without purification, may be converted to the keto acid compounds.

CORN MILLING TEST.

Majel M. MacMasters, Peggy Baird and Carl E. Rist.
U. S. Patent 2,592,585. April 15, 1952.

Corn is tested by splitting the kernels longitudinally, perpendicular to the broad face, and exposing the cut surface to an aqueous solution of 2,3,5-triphenyltetrazolium chloride. Millability of the corn is indicated by a pink to carmen-red coloration of at least the plumule and mesocotyl region. Corn damaged by freezing or overheating does not exhibit such coloration.

PROCESS FOR THE PREPARATION OF INOCULUM FOR USE IN THE FERMENTATIVE PRODUCTION OF SODIUM GLUCONATE.

Russell H. Blom, Virgil E. Sohns and Andrew J. Moyer.
U. S. Patent 2,594,283. April 29, 1952.

A germinated inoculum for use in the fermentation production of sodium gluconate is prepared by inoculating a nutrient medium containing 3 to 12 percent glucose with spores of a gluconic acid-producing mold (*Aspergillus niger*). The medium is incubated under submerged aerobic conditions, and the pH of the medium maintained above 4.5 by controlling the rate of aeration.

ACRYLONITRILE PROTEIN DERIVATIVES.

John C. Cowan, Cyril D. Evans and Leonard L. McKinney.
U. S. Patent 2,594,293. April 29, 1952.

A protein derivate suitable for spinning into fibers is prepared by reacting a protein (zein, casein, or soybean protein) with acrylonitrile in aqueous alkaline dispersion. The dispersion is aged to develop a proper spinning viscosity. Formaldehyde may be added to stabilize the dispersion.

STABILIZATION OF GLYCERIDE OILS WITH IMINODISUCCINIC ACID.

John C. Cowan and Cyril D. Evans.
U. S. Patent No. 2,594,294. April 29, 1952.

Glyceride oils are stabilized against oxidative deterioration and the development of off-flavors and odors by the addition of a small amount (0.01 percent) of iminodisuccinic acid. The stabilizer may be added during refinement of the oils, conveniently just prior to the deodorization step.

PREPARATION OF STARCH SPONGE.

Majel M. MacMasters and Virginia E. Hoaglund.
U. S. Patent 2,597,011. May 20, 1952.

Starch is pasted in water (about 7-11 percent) and frozen at about -18° C. The rate of freezing is such that minute, discrete ice crystals are formed. The frozen starch is then thawed.

PREPARATION OF DRYING OILS.

Howard M. Teeter.
U. S. Patent 2,598,729. June 3, 1952.

Long chain fatty acid esters, containing substituted halogens (chlorinated soybean oil or chlorinated methyl oleate) in which the halogens are attached to non-adjacent carbon atoms, are dehydrohalogenated by treatment with salts of weak acids (sodium bicarbonate) to produce unsaturated products possessing a high proportion of conjugated olefinic linkages. The product possesses improved drying properties.